bürkert
FLUID CONTROL SYSTEMS

Type 8022

Flow Transmitter / Pulse divider
Durchflusstransmitter / Impulsteiler
Transmetteur de débit / Diviseur d'impulsions

MAN 1000217540 EN Version: A Status: RL (released | freigegeben) printed: 19.01.2015

Operating Instructions (from device Version 2)

Bedienungsanleitung (ab Geräte-Version 2)
Manuel d'utilisation (à partir de la version 2 de l'appareil)

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We reserve the right to make technical changes without notice.
Technische Änderungen vorbehalten.
Sous réserve de modifications techniques.

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1. OPERATING INSTRUCTIONS

The operating instructions describe the entire life cycle of the device. Keep these instructions in a location which is easily accessible to every user, and make these instructions available to every new owner of the device.

1.1. Symbols used

CAUTION!

Warns of a possible danger!

- Failure to observe this warning may result in a moderate or minor injury.

NOTE

Warns of damage to property!

- Failure to observe the warning may result in damage to the device or the equipment.

Indicates important additional information, tips and recommendations.

refers to information in these operating instructions or in other documentation.

→ designates a procedure which you must carry out.

1.2. Definition of the term "device"

In these instructions, the term "device" always refers to the flow transmitter or pulse divider Type 8022.

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2. INTENDED USE

Use of this device that does not comply with the instructions could present risks to people, nearby installations and the environment.

- The flow transmitter or pulse divider is an electronic module that is designed for use in industrial environments. The electronic module must be associated to a Bürkert flow sensor.
- Do not use the device outdoors.
- Protect the device against electromagnetic interference, ultraviolet rays and, when installed outdoors, the effects of climatic conditions.
- Use the device in compliance with the characteristics and commissioning and use conditions specified in the contractual documents and in the operating instructions.
- Requirements for the safe and proper operation of the device are proper transport, storage and installation, as well as careful operation and maintenance.
- Only use the device as intended.

→ If exporting the device, observe any existing restrictions.

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3. BASIC SAFETY INSTRUCTIONS

These safety instructions do not make allowance for any

- contingencies and events which may arise during the installation, operation and maintenance of the devices.
- local safety regulations – the operator is responsible for observing these regulations, also with reference to the installation personnel.

Various dangerous situations

To avoid injury take care:

- not to use the device in explosive atmospheres.
- not to use the device in an environment incompatible with the materials it is made of.
- not to subject the device to mechanical loads (e.g. by placing objects on top of it or by using it as a step).
- not to make any external or internal modifications to the device.
- to prevent any unintentional power supply switch-on.
- to ensure that installation and maintenance work are carried out by qualified, authorised personnel in possession of the appropriate tools.
- to guarantee a defined or controlled restarting of the process, after a power supply interruption.
- to use the device only if in perfect working order and in compliance with the instructions provided in the operating instructions.
- to observe the general technical rules when installing and using the device.

NOTE

Electrostatic sensitive components/modules!

The device contains electronic components, which react sensitively to electrostatic discharge (ESD). Contact with electrostatically charged persons or objects is hazardous to these components. In the worst case scenario, they will be destroyed immediately or will fail after start-up.

- Observe the requirements in accordance with EN 61340-5-1 and 5-2 to minimize/avoid the possibility of damage caused by a sudden electrostatic discharge!
- Also, ensure that you do not touch electronic components when the power supply voltage is present!

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4. GENERAL INFORMATION

4.1. Contact address

Germany

Bürkert Fluid Control Systems
Sales Center
Christian-Bürkert-Str. 13-17
D-74653 Ingelfingen
Tel. + 49 (0) 7940 - 10 91 111
Fax + 49 (0) 7940 - 10 91 448
E-mail: info@de.buerkert.com

International

Contact addresses can be found on the final pages of the printed operating instructions.

And also on the Internet at:

www.burkert.com

4.2. Warranty

The warranty is only valid if the Type 8022 is used as intended in accordance with the specified application conditions.

4.3. Information on the Internet

The operating instructions and data sheets for Type 8022 can be found on the Internet at:

www.buerkert.com

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5. DESCRIPTION

5.1. Intended application area

The flow transmitter / pulse divider Type 8022 is designed for use in industrial environments, in particular for the area of control technology.

5.2. General description

The device type 8022 is an electronic module that, when it is combined with a flow sensor, converts into a flow rate the fluid velocity measured by the sensor.

The electronic module may be fitted with a display and configuration unit.

The electronic module may operate as a flow transmitter thanks to a 4-20 mA current output, or as a pulse divider. By default, it operates as a flow transmitter.

The display and configuration unit makes it possible to:

- change the operating mode into pulse divider.
- configure the device.

5.3. Combined sensor

- The flow transmitter type 8022 must be combined to a Bürkert flow sensor of the following types: 8020 Low Power, 8030 Low Power or 8070 Low Power.
- The pulse divider type 8022 can be combined to a flow sensor type 8020 with a pulse output, 8030 with a pulse output or 8070 with a pulse output.

5.4. Functions

NOTE

The device is not tight when the display and configuration unit is removed.

- Screw the cover with order code 670549 on the device as soon as the display and configuration unit is removed.

The display and configuration unit is only required to indicate the flow rate or to configure the device type 8022. It can be removed after the settings have been made.

- When operating as a flow transmitter, the 8022 converts the frequency signal generated by the combined Bürkert flow sensor into an analogue 4-20 mA current signal (2-wire connection).
- When operating as a pulse divider, the 8022 converts the frequency signal generated by the combined Bürkert flow sensor into an adjustable frequency signal (3-wire connection).

5.5. Available devices

Electrical connection	Display and configuration unit	Order code
M12 male fixed connector	yes	215647
	no	215646
PG16 cable gland	yes	215645
	no	215644

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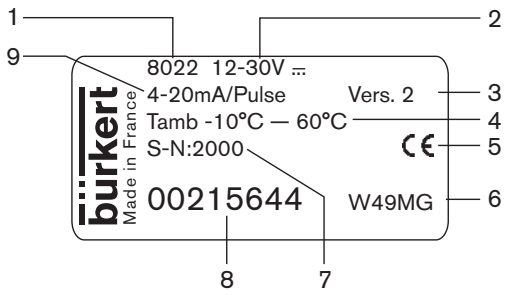
5.6. Description of the name plate



1. Type of the device
2. Voltage supply
3. Version of the device
4. Ambient operating temperature
5. Conformity logo
6. Construction code
7. Serial number
8. Order code
9. Type of outputs

Fig. 1: Example of a 8022 name plate

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6. TECHNICAL DATA

6.1. Conformity

The device is approved by EC and conforms to the standards mentioned on the EC declaration of conformity.

6.2. Operating conditions

Ambient temperature (operating)	-10 °C...+60 °C
Protection class	IP65 according to EN 60529, the device being wired and the cable gland tightened or the female connector plugged-in and tightened
Combined flow sensor ▪ Flow transmitter 8022 ▪ Pulse divider 8022	 ▪ only Bürkert flow sensors types 8020 Low Power, 8030 Low Power or 8070 Low Power. ▪ any flow sensor 8020 with pulse output, 8030 with pulse output or 8070 with pulse output.

6.3. General technical data

6.3.1. Mechanical data

Dimensions	70 x 32 x 42,5 mm (L x l x H)
Fastening ▪ device without display and configuration unit ▪ device with display and configuration unit	 ▪ 1 M3 x 35 screw ▪ 1 M3 x 45 screw
Housing material	polyamide/polycarbonate
Material of the seals ▪ seal for the sensor fixed connector ▪ seal for the cover	 ▪ NBR ▪ EPDM

6.3.2. Electrical data

Electrical connection	▪ 4-pin terminal strip, 1.5 mm² max. wire section, 6 - 7 mm cable diameter ▪ M12 male fixed connector
Supply voltage	V+ : 12-30 V DC +- 10%, residual ripple < 5%
Frequency input	1-600 Hz, sensor power supply approx. V+ - 1 V
4-20 mA output ▪ Accuracy ▪ Min. voltage drop at the device terminals ▪ Loop impedance	 ▪ +/- 1,5% of the full scale ▪ < 10 V at 20 mA ▪ max. 100 Ω at 12 VDC, max. 700 Ω at 24 VDC, max. 1000 Ω at 30 VDC
NPN/PNP output ▪ Accuracy	open collector, 50 mA max. current, frequency up to 600 Hz ▪ +/- 1% of the measured value
Power consumption	< 200 mW

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7. ASSEMBLY, INSTALLATION

7.1. Assembly of Type 8022

Fig. 1 shows how Type 8022 is screwed to the sensor.

NOTE

For the fault-free operation of the Type 8022 observe the following during installation:

- When screwing to the sensor, ensure the seal is seated correctly.
- Torque the screw to a value between 0.2 and 0.3 Nm, in order not to damage the housing. With a damaged housing, correct operation cannot be guaranteed.

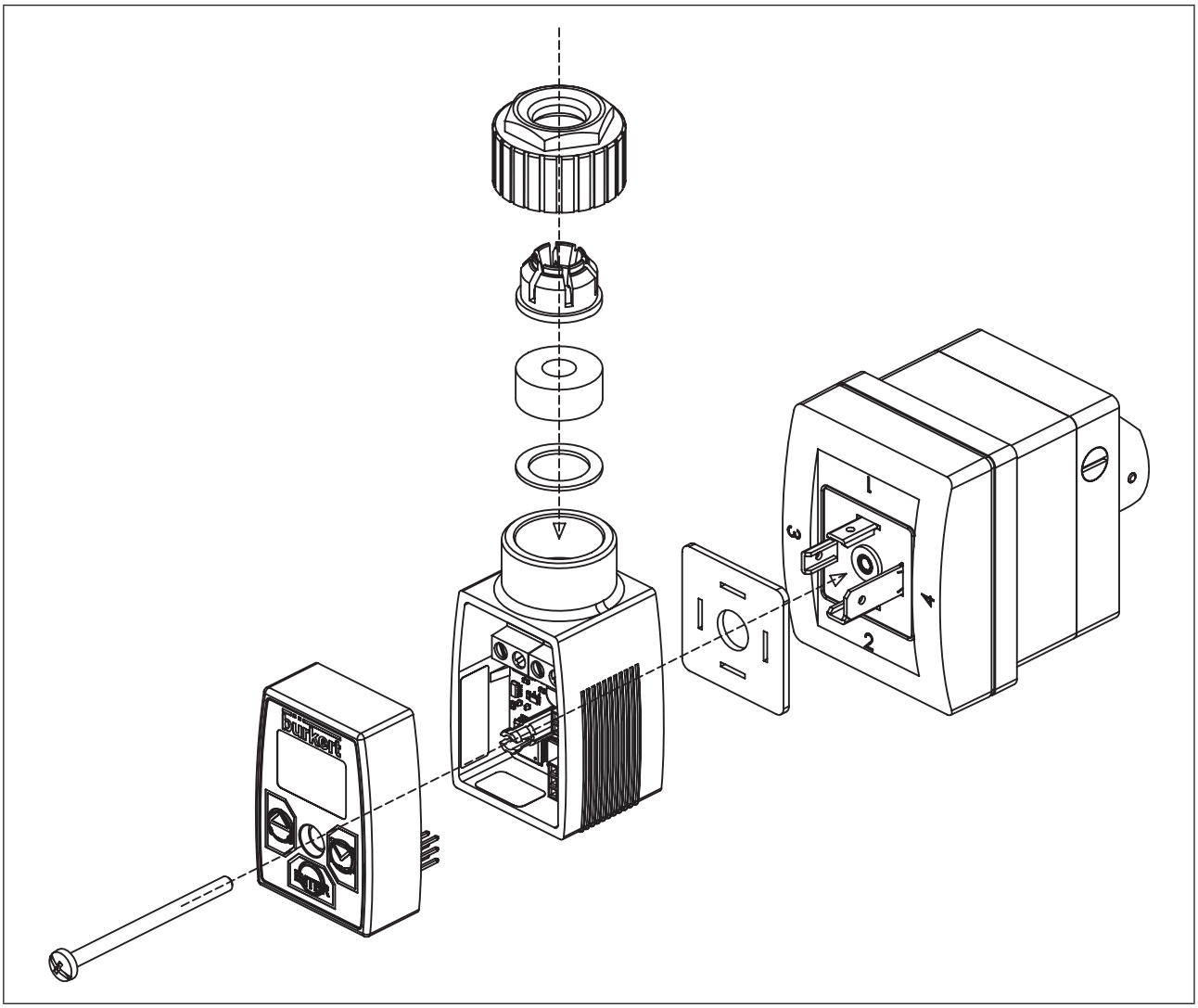

Fig. 2: Installing Type 8022 on the sensor

7.2. Electrical installation

The electrical connection of the device is made on a terminal strip via cable gland, or an M12 male fixed connector.

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Terminal assignment	
1	NPN
2	PNP
3	12 - 30 V DC
4	GND

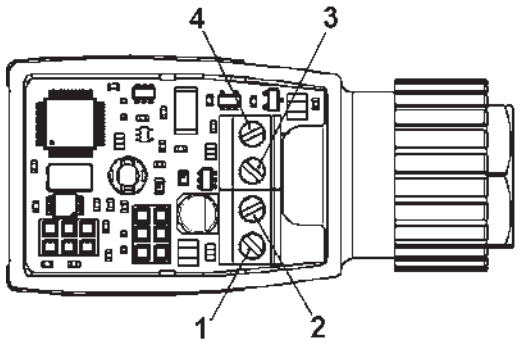

Fig. 3: Terminal assignment of a version with cable gland

Pin assignment	
1	12 - 30 V DC
2	NPN
3	GND
4	PNP

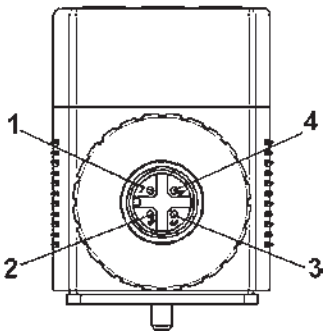

Fig. 4: Pin assignment of the M12 male fixed connector

→ Wire the device following the possibilities described below.

7.2.1. Connection of the flow transmitter

When operating as a flow transmitter, the NPN and PNP outputs have no function.

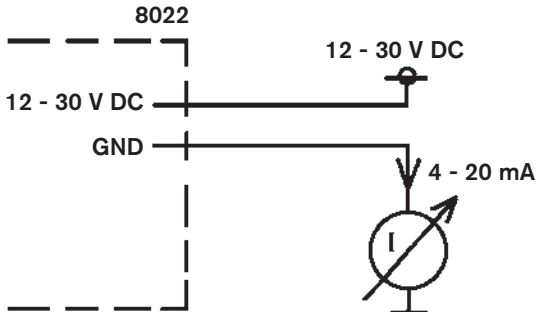

Fig. 5: Connection of the flow transmitter

7.2.2. Connection of the pulse divider

The pulse divider type 8022 has 1 NPN pulse output and 1 PNP pulse output. Connect the pulse divider with 3 wires.

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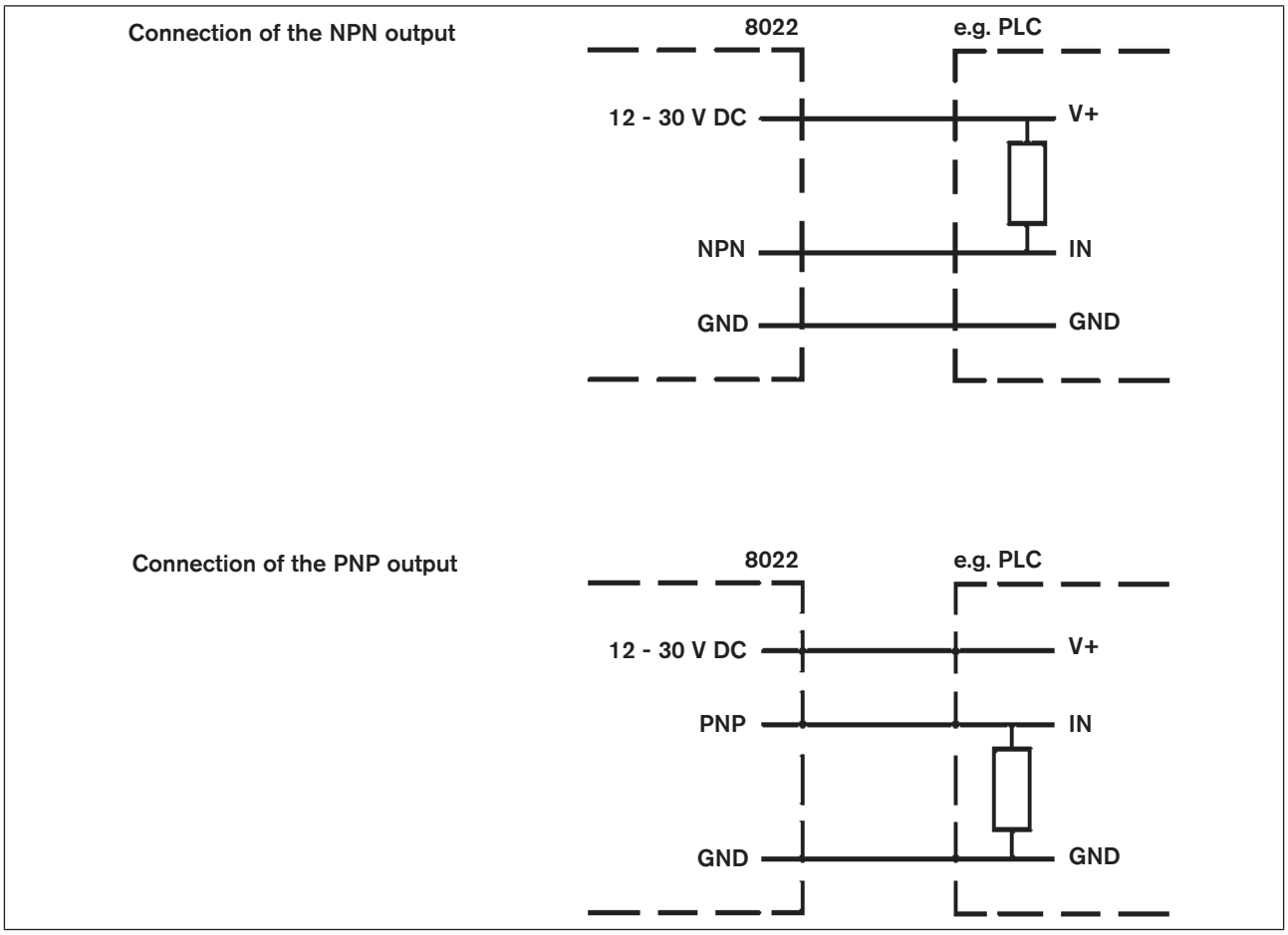

Fig. 6: Connection of the NPN output or the PNP output of the pulse divider

8. COMMISSIONING

NOTE

- Only power on the device when the cover is closed.
- Switch off the device before removing the display and configuration unit.

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9. SETTING AND FUNCTIONS

9.1. Display and control keys

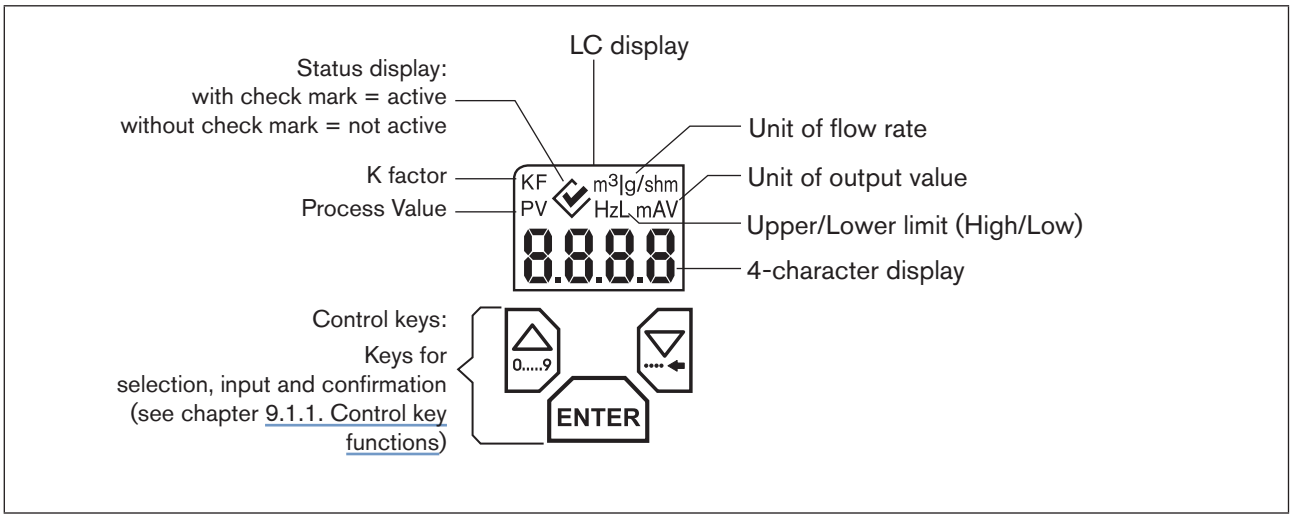

Fig. 7: Display and control keys

9.1.1. Control key functions

The device is operated using two arrow keys and one ENTER key.

Their function with regards to the operating level is described in the following table.

Operating level (see chapter 9.3. Operating levels)	0.....9		ENTER
Level 1: Read level	Switching over the display value from: ▪ PV ProcessValue in set flow rate unit ▪ PV ProcessValue in mA ▪ PV ProcessValue in Hz (frequency of sensor)		Press and hold for 3 s: Change to the configuration level
Level 2: Configuration level	Scroll up (select).	Scroll down (select).	Confirm parameter, change between parameters. Select and deselect parameter, confirm set values. Change to Read level when *End* is shown
	Enter values Increase numerical value by one value.	Change by one position to the left.	

Tab. 1: Control keys

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9.2. Operation as flow transmitter or pulse divider

9.2.1. Operation as a flow transmitter

For operation as a flow transmitter, the device is connected in 2-wire mode. The frequency value of the sensor (e.g. Bürkert Types 8020 Low Power, 8030 Low Power, 8070 Low Power) is converted into a 4-20 mA signal.

Setting:

→ Set the K factor of the fitting used (see operating instructions of the fitting used).

→ Always set the K factor in the pulse/liter unit.

→ Associate the 4-20 mA signal with a flow rate range using the upper and lower limits.

9.2.2. Operation as a pulse divider

For operation as a pulse divider, the device is connected in 3-wire mode.

This operation makes it possible to send a pulse out on the NPN and PNP outputs each time the set volume has been counted. The frequency value of the sensor is thus converted via the K factor and the volume set for a pulse.

Setting:

→ Set the K factor of the fitting used (see operating instructions of the fitting used).

→ Set the volume for each pulse sent out on the NPN and PNP outputs.

The K factor is always set in the unit pulse/liter whatever the setting in the parameter *Unit*.

9.3. Operating levels

For operating the flow transmitter / pulse divider there are 2 levels available: the Read level and the configuration level.

Level 1: Read level

When the device is switched on, it is at the Read level. The flow rate measured by the connected sensor is indicated.

At this level use the arrow keys to successively read different values and define which of them stays displayed. The values differ depending whether the device is operating as a flow transmitter or a pulse divider.

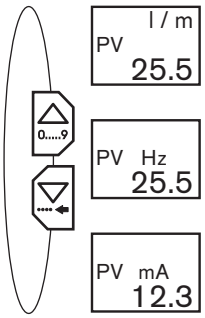
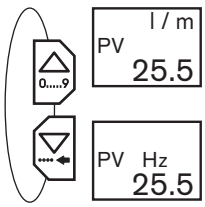
Flow transmitter	Pulse divider
 Flow rate in liters/minute Input frequency of the flow rate sensor [Hz] Output current [mA]	 Flow rate in liters/minute Input frequency of the flow rate sensor [Hz]

Fig. 8: Level 1: Display options when operating as a flow transmitter or a pulse divider

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Level 2: Configuration level

At this level, the settings for the device are made.

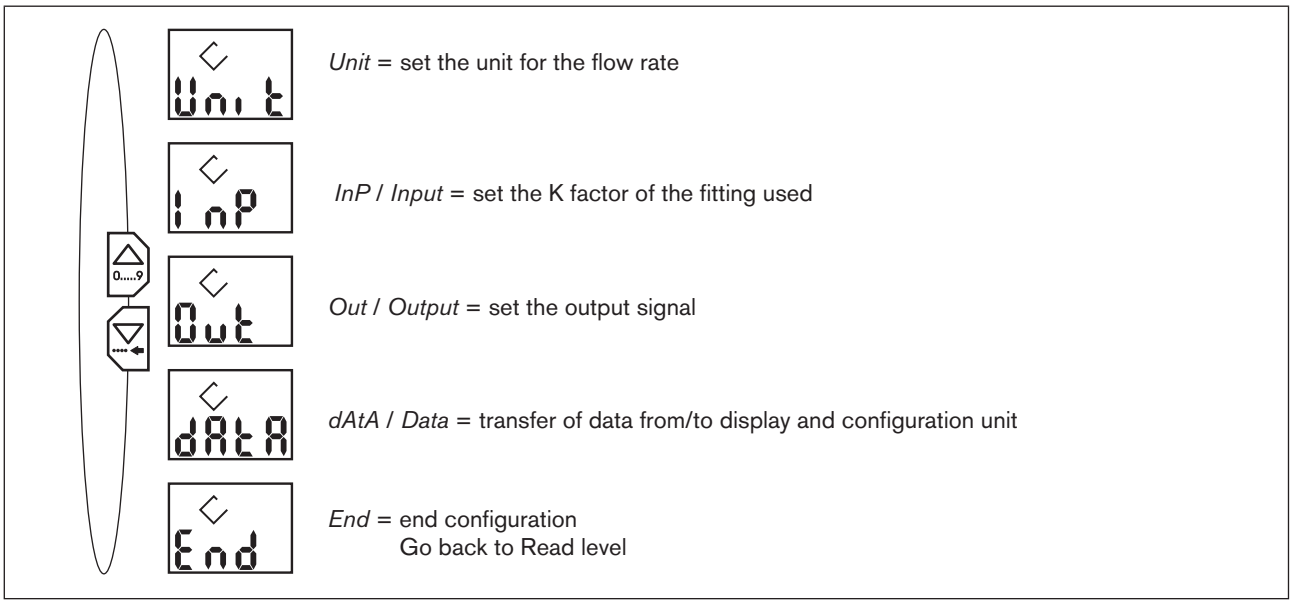
Unit
InP
Out
dAtA
End
Unit = set the unit for the flow rate
InP / *Input* = set the K factor of the fitting used
Out / *Output* = set the output signal
dAtA / *Data* = transfer of data from/to display and configuration unit
End = end configuration
Go back to Read level

Fig. 9: Level 2: Define the settings

9.3.1. Switching between the operating levels

When the device is switched on, it is at the Read level.

→ Press and hold the ENTER key (3 seconds) to switch to the configuration level.

→ Confirm *End* in the main menu loop using the ENTER key to return to the Read level.

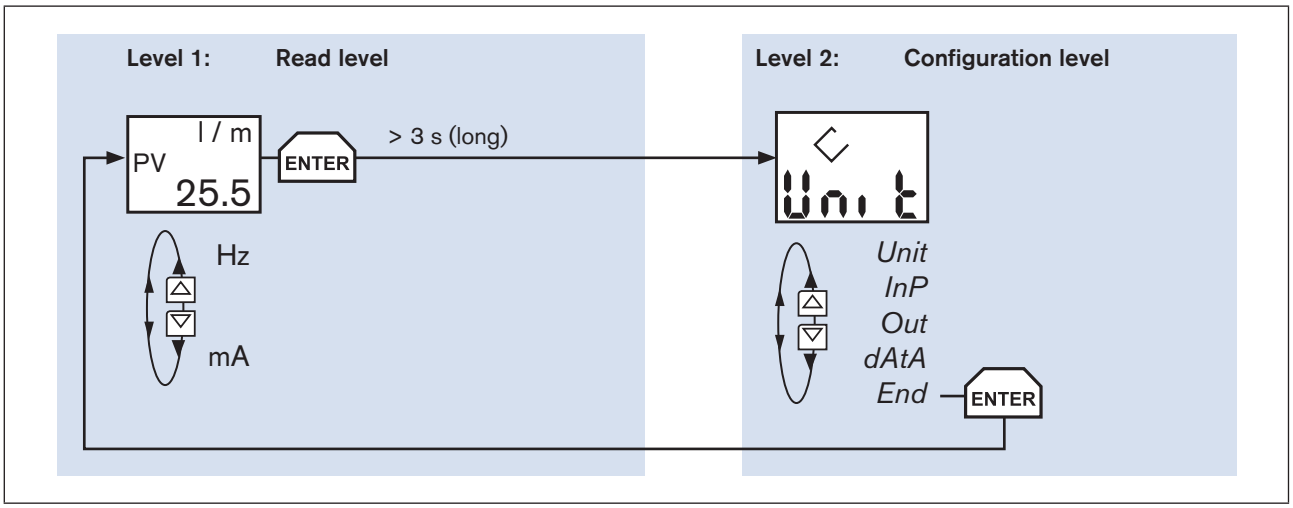

Fig. 10: Switching between the operating levels

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9.4. Main menu of the configuration level

→ Press and hold the ENTER key (3 s) to access the configuration level.

The following settings are possible:

Unit	*Unit* = set the unit for the flow rate, see chapter 9.4.1
InP	*InP* / *Input* = set the K factor of the fitting used, see chapter 9.4.2
Out	*Out* / *Output* = set the output signal, see chapter 9.4.3
dAtA	*dAtA* / *Data* = transfer of data from/to the display and configuration unit, see chapter 9.4.4

Leaving the configuration level:

End	*End* = end the settings and go back to the Read level by pressing the ENTER key when *End* is displayed.

9.4.1. *Unit* – Setting the unit for the flow rate

In this parameter, set the unit the measured flow rate is displayed in and in which the limits of the flow rate range associated to the 4-20 mA output are defined.

When changing the unit (e.g. from liters to gallons), also change the current output limits.

Setting in the parameter:

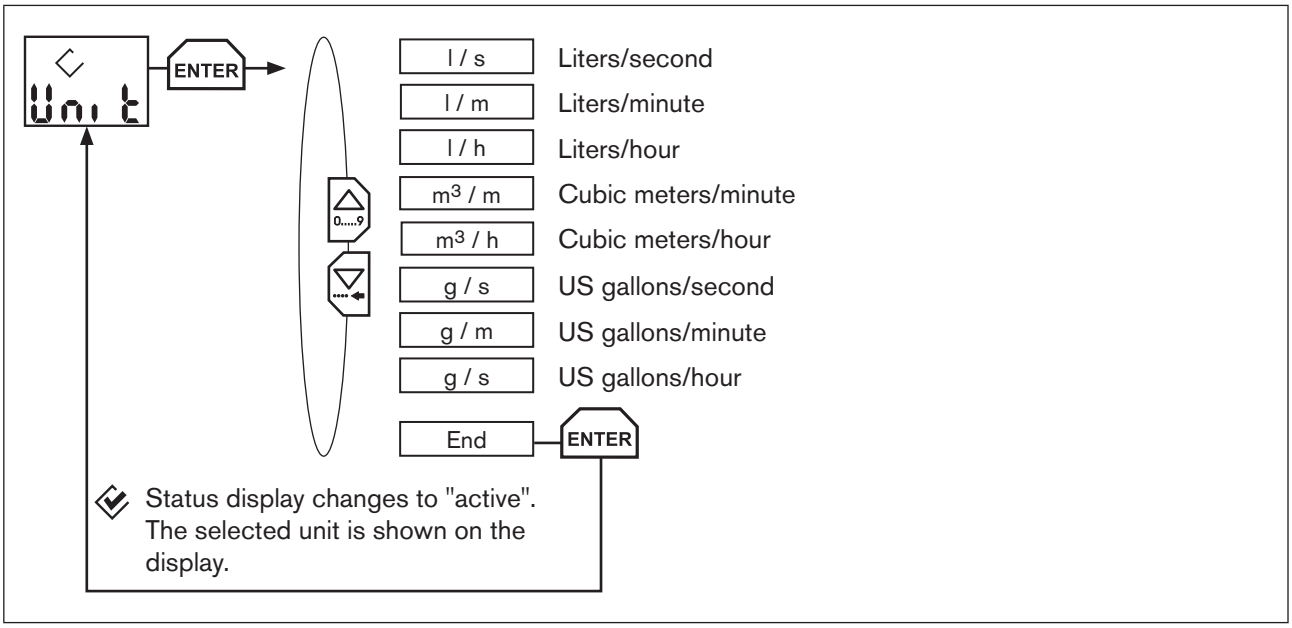

Fig. 11: Unit – Setting the display for the flow rate unit

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9.4.2. *InP (Input)* – Setting the K factor of the fitting used

→ In this parameter, set the K factor of the fitting used, in pulses/liter.

Using a pre-set value (this function is not available on a “Version 1” device. Refer to the nameplate)

When using a pre-set K factor, check that the factor indicated in the operating instructions of the fitting used is the same as the one displayed by the 8022.

The K factors of the Bürkert sensors types 8020, 8030 and 8070 are pre-set within the 8022, for each form of the fitting S020, S030 or S070.

→ Choose the sensor type associated to the 8022, then, depending on the type of sensor :

- Type 8020 – choose the fitting, material and DN
- Type 8030 – choose the material and DN
- Type 8070 – choose the DN

The pre-set K factor is displayed.

Directly setting the value of the K factor:

In the *FrEE* parameter, directly enter the K factor of the fitting used. Observe the K factor given in the operating instructions of the fitting (e.g. of type S020, S030 or S070).

After the set K factor has been confirmed using the ENTER key, the value in the *FrEE* parameter is overwritten.

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Setting in the parameter:

This function is not available on a “Version 1” device. Refer to the nameplate

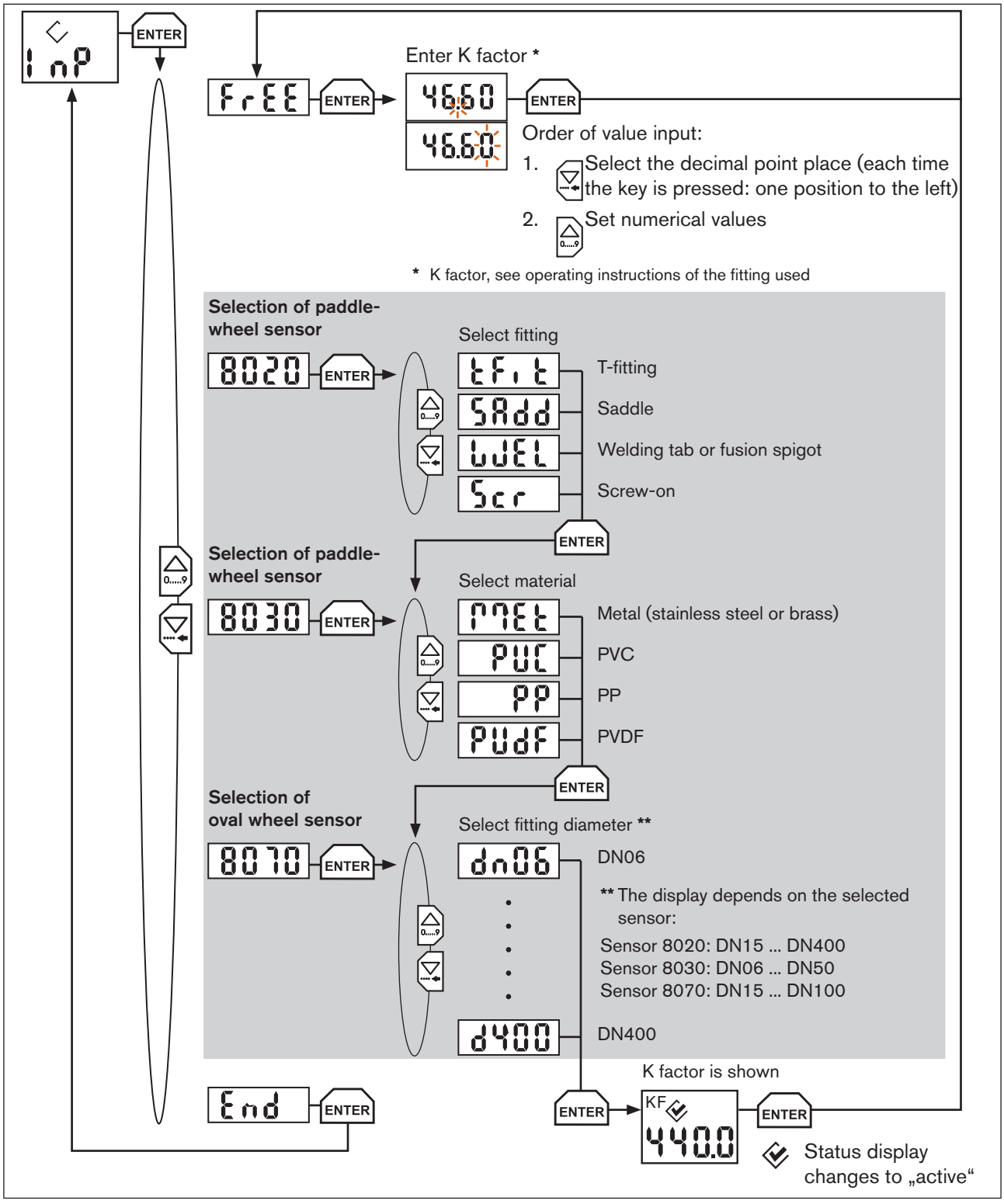

Fig. 12: Input – Setting the K factor

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9.4.3. *Out (Output)* – Setting the output signal

In this parameter, define whether the device is to work as a flow transmitter or a pulse divider.

Setting as flow transmitter *(4 - 20 mA)*:

When changing the unit (e.g. from liters to gallons) the limit values for the current output are not converted automatically

→ Set the lower and upper limit values for the flow rate range associated to the 4-20 mA output, in the unit set within the UNIT parameter.
The lower limit value is marked by an L (low) on the display and the upper limit value by an H (high).

Setting as pulse divider *(PULS)*:

→ Set the volume, in the displayed unit, for each pulse emitted on the NPN and PNP outputs.

Setting in the parameter:

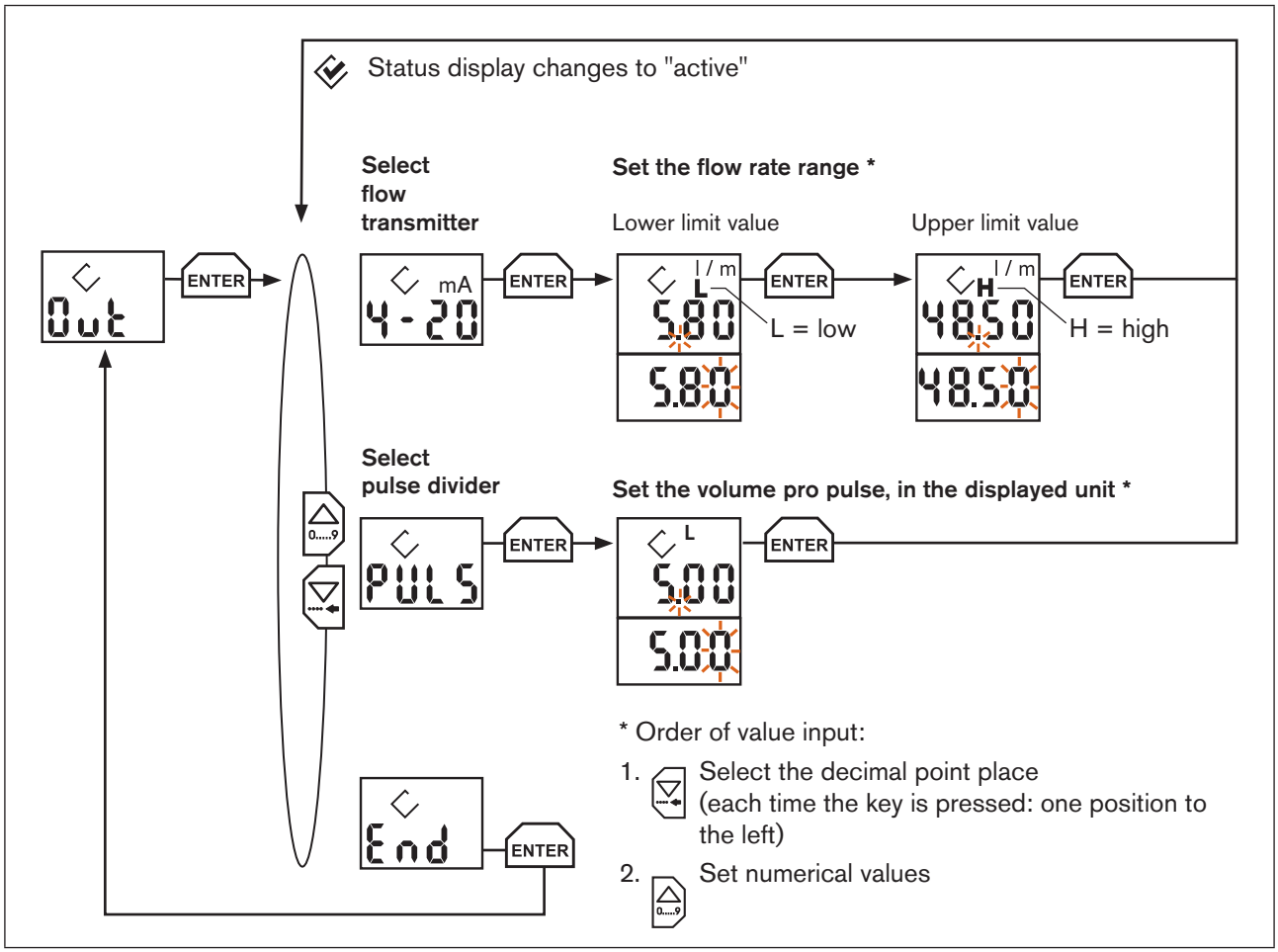

Fig. 13: Out – Setting the output; operation as flow transmitter or pulse divider

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9.4.4. *dAtA (Data)* – Uploading and downloading the device settings

This function is not available on a "Version 1" of the device. Refer to the name plate of the device.

The parameter makes it possible to transfer the device settings from one device to another by means of the display and configuration unit.

Access the parameter:

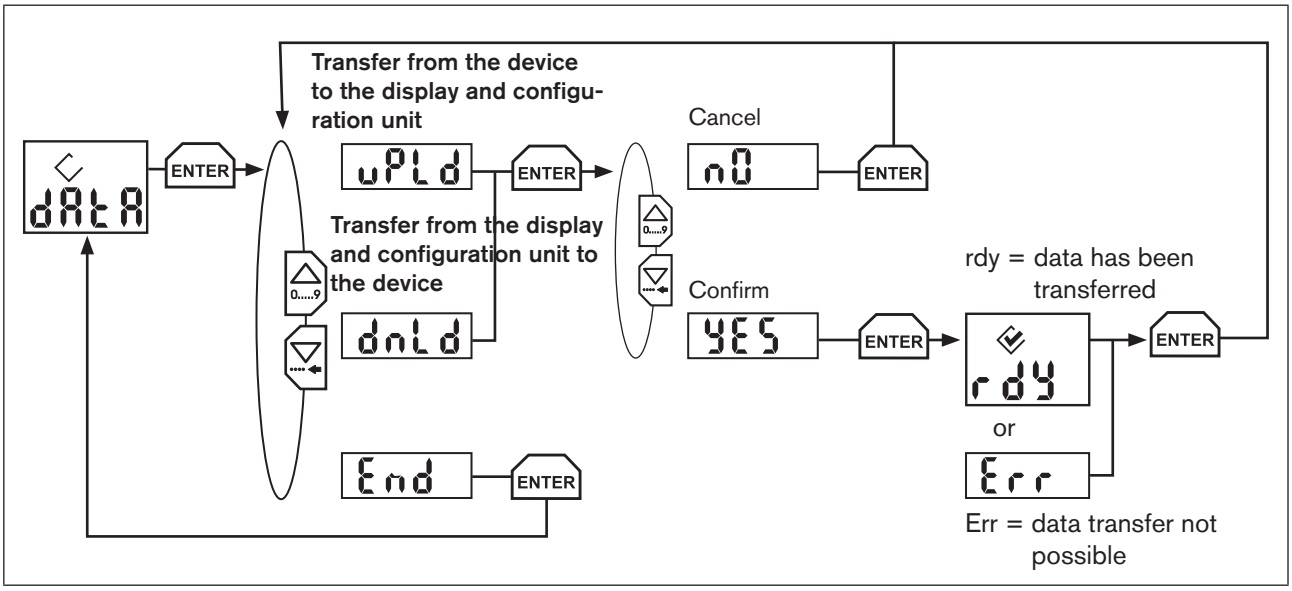

Fig. 14: Data – Transfer of data from/to display and configuration unit

Upload *(uPLd)*:

When uploading, the device settings are transferred to the display and configuration unit.
After the data has been transferred, "ready" (rdy) is displayed.
If the data could not be transferred to the display and configuration unit, the error message "*Err*" is displayed.

Download *(dnLd)*:

When downloading, the device settings previously uploaded in the display and configuration unit are transferred to another 8022 device.
After the data has been transferred, "ready" (rdy) is indicated on the display.
If the data could not be transferred to the 8022 device, the error message "*Err*" is displayed.

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10. MAINTENANCE, TROUBLESHOOTING

10.1. Maintenance work

The flow transmitter / pulse divider Type 8022 is maintenance-free when operated according to these operating instructions.

10.2. Error messages

Error messages are only displayed at the Read level. They are shown alternately (flashing) with the process value.

Error	Cause	Troubleshooting
ERR1	Value cannot be displayed (e.g. value too high).	▪ Change the fow rate unit (see chapter 9.4.1. Unit – Setting the unit for the flow rate).
ERR2	Input frequency of sensor higher than 600 Hz.	▪ Use a suitable sensor.
ERR3	Calculated output current not within range of 4-20 mA or K factor = 0.	▪ Correctly set the flow rate range associated to the 4-20 mA current output. ▪ Use a different sensor and/or correctly set the K factor of the fitting used.
ERR4	Limit values of the flow rate range associated to the 4-20 mA current output not correct (Low > High).	Correctly set the values.
ERR5	The K factor times the set volume (converted in liters) pro pulse is < 1.	▪ Check the set K factor. ▪ If the K factor is correct, enter a higher volume pro pulse so that the K factor times the set volume (converted in liters) pro pulse is equal to or higher than 1.

Tab. 2: Error messages

10.3. Default values

Upon delivery, the following default values are saved:

Parameter	Value
Unit	Liters/second [l/s]
K factor (of fitting used)	1 pulse/liter [imp/l]
Volume pro pulse	1 liter
Output signal (*OUT*)	4-20 mA
Lower flow rate limit	0 liters/second [l/s]
Upper flow rate limit	250 liters/second [l/s]

Tab. 3: Default values

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11. SPARE PARTS / ACCESSORIES

Spare part /accessory	Order code
Display and configuration unit	**562 876**
Transparent cover, with screw and seal (for operating without display and configuration unit)	**670 549**
4-pin M12 female right-angle connector	**784 301**
4-pin M12 female connector moulded on 5-m long cable	**918 038**

Tab. 4: Ordering table of spare parts and accessories

12. PACKAGING AND TRANSPORT

NOTE

Transport damage!
Inadequately protected equipment may be damaged during transport.
- During transportation protect the device against moisture and dirt in shock-resistant packaging.
- Do not allow the temperature to exceed or drop below the permitted storage temperature.

13. STORAGE

NOTE

Incorrect storage may damage the device.
- Store the device in a dry and dust-free location!
- Storage temperature. -20 … 65 °C.

14. DISPOSAL

→ Dispose of the device and packaging in an environmentally friendly manner.

Observe national waste disposal regulations.

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